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Resources, Community, and
Economic Development Division

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June 30, 2000

The Honorable Fred Thompson
Chairman
The Honorable Joseph I. Lieberman
Ranking Minority Member
Committee on Governmental Affairs
United States Senate

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Subject: Observations on the National Science Foundation's Fiscal Year 1999
Performance Report and Fiscal Year 2001 Performance Plan

As you requested, we have reviewed the 24 Chief Financial Officers (CFO) Act agencies' fiscal year 1999 performance reports and fiscal year 2001 performance plans required by the Government Performance and Results Act (GPRA) of 1993. In essence, under GPRA annual performance plans are to establish performance goals and measures covering a given fiscal year and provide the direct linkage between an agency's longer-term goals and day-to-day activities. Annual performance reports are to subsequently report on the degree to which those performance goals were met. This report contains two enclosures responding to your request concerning key program outcomes and major management challenges at the National Science Foundation (NSF). Enclosure I provides our observations on NSF's fiscal year 1999 actual and fiscal year 2001 planned performance for the key outcomes that you identified as important mission areas for the agency. These key outcomes are (1) discoveries at and across the frontier of science and engineering and (2) efficient and effective administration of research grants. Enclosure II lists the major management challenges facing the agency that NSF's Inspector General (IG) identified, the progress the agency has made in addressing these challenges as discussed in its fiscal year 1999 performance report, and the applicable goals and measures in the fiscal year 2001 performance plan.

Results in Brief

NSF's fiscal year 1999 performance report demonstrates that the agency was generally successful in achieving the outcome involving "discoveries at and across the frontier of science and engineering" in research areas such as biology, Arctic and Antarctic research, and discoveries in how the young learn. NSF judged its

GAO/RCED-00-205R NSF's FY 1999 Performance Report and FY 2001 Performance Plan

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performance as successful on the basis of (1) program reviews by independent committees and (2) examples of outstanding science chosen to show NSF's achievements. The performance report, however, sheds little light on the quality of the committees' reports, and NSF officials acknowledged that the quality of these reports varied. As a result, in its fiscal year 2001 performance plan, NSF cites numerous shortcomings in the committees' program evaluations, such as "ratings" without complete information or examples and not including information on NSF's funding level needed to judge the extent of NSF's role in achieving these results. Like the committees' reports, the fiscal year 1999 performance report also fails to describe NSF's financial role in the examples of scientific successes presented. Despite these limitations, the performance report adequately condenses the committees' numerous program reports, which in turn reflect NSF's accomplishments with regard to this outcome.

NSF revised its fiscal year 2001 performance plan by combining its first outcome for fiscal years 1999 and 2000 (discoveries at and across the frontier of science) and its second outcome for the same period (connections between discoveries and their use in service to society) into a single outcome ("Ideas--Discovery at and across the frontier of science and engineering, and connections to its use in the service of society"). NSF, however, fails to provide a clear statement of expected performance for subsequent comparison. In the plan, the criteria for success in achieving the revised outcome continue to be too general, the strategies and the resources for achieving the goals are not clearly discussed, and no specific links between the resources and the areas of emphasis are included. In addition, the performance plan does not provide confidence that performance information will be credible because, in particular, it offers little assurance that the inconsistent quality of committee reports will be effectively remedied.

NSF's fiscal year 1999 performance report indicates clear progress toward achieving the goals embodied in the second key outcome, "administer research grants efficiently and effectively." The outcome, while not explicitly included among NSF's outcomes in its performance plans for fiscal years 1999 and 2000, may be inferred from several performance goals (such as using merit review in making awards and processing proposals in a timely manner) that are included in its "investment and management process" goals. The included goals and measures are generally objective and quantifiable, and NSF sets high standards and percentages for achieving most goals while appropriately setting lower percentages for others. The performance report adequately reflects that NSF achieved some, but not all, of these goals. For example, NSF exceeded its goal of allocating at least 90 percent of its funds to merit-reviewed projects, but it failed to meet its goal of processing 70 percent of the proposals within 6 months of receiving them. For the unmet goals, however, the performance report does not provide both a statement of the reasons for falling short of the performance measures and a strategy for attaining them in the future. In general, the performance report provides virtually no assurance that the information is credible with respect to these goals.

Among the key changes in the fiscal year 2001 performance plan, NSF expands the definition of merit review by including the integration of research and education as a

factor to be considered in making awards. The plan also sets higher standards for certain aspects of the awards process and for increasing reliance on electronic procedures. In this regard, the plan adds a goal to conduct 10 pilot paperless projects that manage the competitive review process in a totally electronic environment. For the new elements in merit review, NSF provides a clear strategy to achieve its goal. However, in other instances, such as electronic filings, NSF provides little useful information about its intended strategy. Additional discussion of the problems and the strategy for achieving this goal would have been helpful because NSF's performance actually slipped from 59 percent in fiscal year 1998 to 58 percent in fiscal year 1999. NSF's fiscal year 2001 performance plan includes only a few clear statements about the steps to be taken to verify and validate the data. In general, as with the performance report, the fiscal year 2001 plan provides virtually no assurance that the information about achieving the goals in this plan will be credible.

NSF's fiscal year 1999 performance report and fiscal year 2001 performance plan discussed 2 of the 10 major management challenges identified by NSF's IG but did not address directly or indirectly the other 8 challenges. The report and plan addressed the agency's progress in managing an effective merit review system and implementing a new electronic proposal and award information system. The IG no longer considers these issues as major challenges but stressed the need for NSF to be alert to emerging situations that could result in their becoming a problem. The IG expressed the same view regarding four of the remaining eight challenges. The IG said that NSF was taking effective steps to respond to these challenges and did not need to include them in the performance report or future performance plans. However, the IG continues to be concerned about the four remaining challenges that the performance report did not discuss. These challenges are all part of a single larger issue about the adequacy of NSF's strategy and resources for effective oversight. The IG focused on such problems as NSF's lack of a system to assess the relative vulnerabilities of its programs and the commitment of NSF's funds to larger, multidisciplinary projects that make oversight more difficult. As such, the overall issue involving oversight activities might be suitable for inclusion in future performance plans. NSF may want to consider whether to (1) develop a clear statement of the IG's concerns about oversight activities, (2) assess its programs for their degree of risk, (3) set measurable goals with the level of monitoring corresponding to the level of risk, (4) identify the level of resources needed to achieve these goals, and (5) make these goals and measures a clear part of its GPRA performance plans in the future.

Objectives, Scope, and Methodology

Our objectives concerning selected key agency outcomes were to (1) identify and assess the quality of the performance goals and measures directly related to a key outcome, (2) assess the agency's actual performance in fiscal year 1999 for each outcome, and (3) assess the agency's planned performance for fiscal year 2001 for each outcome. Our objectives concerning major management challenges were to (1) assess how well the agency's fiscal year 1999 performance report discussed the progress it had made in addressing the major management challenges that the

agency's IG had previously identified and (2) identify whether the agency's fiscal year 2001 performance plan had goals and measures applicable to the major management challenges. As agreed, in order to meet the committee's tight reporting time frames, our observations were generally based on the requirements of GPRA, guidance to agencies from the Office of Management and Budget (OMB) for developing performance plans and reports (OMB Circular A-11, Part 2), previous reports and evaluations by us and others, our knowledge of NSF's operations and programs, and our observations on NSF's other GPRA-related efforts. We did not independently verify the information contained in the performance report or plan. We conducted our review from April through May 2000 in accordance with generally accepted government auditing standards.

Agency Comments and Our Evaluation

We provided a draft of this report to NSF and the Office of the Inspector General for their review and comment. We met with NSF officials, including the Director, Office of Integrative Activities; the Acting Chief Financial Officer; the Director, Information and Resource Management; and the Inspector General, who generally agreed with the accuracy of the facts presented in the draft report. NSF officials, however, provided comments relating to three areas of concern about the GPRA process.

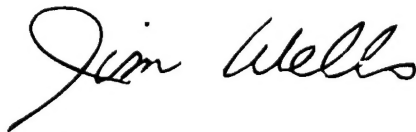
- First, NSF officials said that the agency's approach in this first year of reporting had been to keep the report brief, succinct, low in cost to taxpayers, and on schedule, which may have resulted in a lack of detailed, graphic, and descriptive information needed by some readers. We believe that NSF would not have to greatly expand the report or its plans to cover the key information that was missing. Moreover, NSF officials also indicated that they were concerned with the sequencing of products because the information needed for the fiscal year 1999 GPRA reports is also essential for the fiscal year 1999 accountability report and the performance plans for fiscal years 2000 and 2001. Therefore, according to NSF officials, the current timing of GPRA reports and plans represents a challenge. We believe that when timing is an issue, NSF should state clearly what information is not available for it to develop its reports and plans.
- Second, NSF officials said that in using the alternative format to report outcomes, it used examples chosen to demonstrate the importance of NSF funding in achieving those results. The officials believed that most examples reflect outcomes that are achieved over the long term but are not linked to specific dollar amounts. We believe that NSF's fiscal year 1999 performance report is still unclear on the criteria and method used in determining that its funding played a major role in achieving these outcomes. We believe that in future reports, NSF should demonstrate its role in achieving these outcomes and address this point more clearly in selecting and using examples.
- Third, NSF officials said that the agency did not consider including a discussion of the management challenges in the performance report appropriate because GPRA

does not require it and because NSF addresses the management challenges through the Federal Manager's Financial Integrity Act activities and reports the results in its annual accountability report. In addition, NSF officials said that the internal management controls committee found no items reportable as a material weakness. While including this information in the accountability report is important, OMB Circular No. A-11 (1999) indicates that "performance goals for management problems should be included in the annual plan. . . ." We remain concerned about the oversight issues raised by the Inspector General and would like to see these issues addressed in NSF's performance report and plans.

The IG also provided some technical clarifications that we incorporated as appropriate.

As arranged with your offices, unless you publicly announce its contents earlier, we plan no further distribution of this report until 30 days after the date of this letter. At that time, we will send copies to Dr. Rita R. Colwell, Director, National Science Foundation, and make copies available to others on request.

Please call me on (202) 512-3841 if you or your staff have any questions. Key contributors to this report were Linda L. Harmon and Dennis S. Carroll.



Jim Wells
Director, Energy, Resources,
and Science Issues

Enclosures - 2

Observations on the National Science Foundation's Fiscal Year 1999 Actual Performance and Fiscal Year 2001 Planned Performance Related to Key Outcomes

This enclosure contains our observations on the National Science Foundation's (NSF) fiscal year 1999 actual performance and fiscal year 2001 planned performance for key outcomes identified by the Senate Governmental Affairs Committee as important mission areas for NSF. The key outcomes for NSF are (1) "Discoveries at and across the frontier of science and engineering" and (2) "Administer research grants efficiently and effectively." As requested, we have identified the goals and measures directly related to a selected key outcome. Our observations are organized according to each selected key outcome and follow the goals and measures.

Key Agency Outcome: Discoveries at and Across the Frontier of Science and Engineering

Fiscal Year 1999 Performance Goals and Measures for the Key Agency Outcome of Discoveries at and Across the Frontier of Science and Engineering

Effectiveness of NSF-Supported Research Activities

- Fiscal year 1999 goal: NSF's awards lead to important discoveries; new knowledge and techniques, both expected and unexpected, within and across traditional disciplinary boundaries; and high-potential links across those boundaries.
- Actual: In fiscal year 1999, 35 reports by NSF's Committees of Visitors (COV) and 8 reports by NSF's Advisory Committees (AC) rated NSF for this goal. All reports rated NSF as successful in achieving this goal. **(goal met)**
- Fiscal year 1999 goal: An independent assessment will judge NSF's research programs to have the highest scientific quality and an appropriate balance of projects characterized as high risk, multidisciplinary, or innovative.
- Actual: In fiscal year 1999, all of the COV reports indicated that NSF's programs have high scientific quality. Of the 30 COV reports that gave an opinion on the balance of projects in the programs under review, 24 indicated that the balance was appropriate. Six reports indicated that the programs under review did not have an appropriate balance, with a lack of high-risk projects being the most frequent concern. Two of the six critical reports indicated that the programs lacked innovation. NSF concluded that the goal was achieved. **(goal met)**

GAO's Observations on NSF's Fiscal Year 1999 Actual Performance for the Key Agency Outcome of Discoveries at and Across the Frontier of Science and Engineering

Overall, NSF is partially successful in describing its achievement of this outcome. Its conclusions depend on the quality of the COV and AC reports (which NSF uses to review its programs) and the examples of outstanding science. However, the performance

Enclosure I

report sheds little light on the quality of the COV and AC reports. NSF developed guidelines and templates to promote a uniformly high-quality among the COV and AC reports. Although the guidelines show considerable effort, NSF officials acknowledged that the reports varied in quality, and NSF's fiscal year 2001 plan identifies numerous shortcomings, such as ratings without complete information in the reports.

In addition, the examples in the COV and AC reports and the performance report do not include information on the level of funding by NSF and other sources by which to judge the actual extent of NSF's support and the degree to which success can be attributed to this support. For instance, two of NSF's key examples in the performance report include the work of a Nobel Prize winner in chemistry and of a National Medal of Science awardee. In neither case does the performance report provide sufficient information on funding and other factors to judge NSF's actual role in these achievements.

Despite these limitations, the performance report is partially successful in justifying its conclusion about the achievement of the performance goals. It accurately condenses an extensive series of reports that in turn generally reflect the full range of NSF's activities with regard to this outcome.

Unmet Fiscal Year 1999 Performance Goals and Measures for the Key Agency Outcome of Discoveries at and Across the Frontier of Science and Engineering

NSF rated itself as successful in achieving these two goals but, in the case of the second goal, expressed concern about the appropriate balance of projects that included a lack of (1) high-risk projects in the programs under review and (2) innovation.

GAO's Observations on NSF's Unmet Fiscal Year 1999 Performance Goals and Measures for the Key Agency Outcome of Discoveries at and Across the Frontier of Science and Engineering

NSF's performance report and its fiscal year 2000 plan partially address the unmet fiscal year 1999 performance goals and measures but lack a clear definition of the problem and specificity in the steps required to correct it. NSF's performance report states that staff will be asked to make investments that address this goal and will strive to identify high-risk projects for reviewers and evaluators but provides no additional information on these investments or the steps to be taken. The report states that NSF is also looking at how to improve the indicators for this goal and how to provide better data to evaluators of this goal for fiscal year 2000 but offers no further details.

NSF's fiscal year 2000 performance plan identifies the concern about appropriate balance as an area of emphasis. In response to this concern, NSF will ask all directorate advisory committees to examine the directorates' entire fiscal year 2000 portfolio of research project support activities to identify activities they would characterize as high-risk, multidisciplinary, or innovative and to assess the overall scientific quality and balance with respect to these specific characteristics.

Enclosure I

NSF's fiscal year 2001 performance plan continues this area of emphasis and provides a careful definition of high-risk research that should help reviewers in identifying examples of research in this category. The fiscal year 2001 performance plan repeats the very general statement from the fiscal year 2000 plan about reviewing the entire research portfolio but provides no specific descriptions of the steps needed to implement this intention.

Fiscal Year 2000 Performance Goals and Measures for the Key Agency Outcome of Discoveries at and Across the Frontier of Science and Engineering

NSF maintained the same performance goals and measures in its fiscal year 2000 performance plan except that it dropped the previous criteria for "minimally effective" from this and all other goals.

GAO's Observations on NSF's Fiscal Year 2000 Planned Performance for the Key Agency Outcome of Discoveries at and Across the Frontier of Science and Engineering

NSF's performance report explained the elimination of the criteria for "minimally effective." The report stated that there was little to be gained in defining minimally effective and that, in many instances, the definition was confusing to evaluators. Therefore, as NSF stated, for fiscal year 2000, NSF will define only the "successful" standard.

Fiscal Year 2001 Performance Goals and Measures for the Key Agency Outcome of Discoveries at and Across the Frontier of Science and Engineering

NSF combines its first and second outcome goals into a single goal for fiscal year 2001. This goal appears as follows: Ideas -- Discovery at and across the frontier of science and engineering and connections to its use in the service of society.

NSF's performance is successful when, in the aggregate, results reported in the period demonstrate sufficient progress toward realizing the following four performance goals: (a) a robust and growing fundamental knowledge base that enhances progress in all science and engineering areas; (b) discoveries that expand the frontiers of science, engineering, and technology; (c) partnerships connecting discovery to innovation, learning, and societal advancement; and (d) research and education processes that are synergistically coupled.

GAO's Observations on NSF's Fiscal Year 2001 Planned Performance for the Key Agency Outcome of Discoveries at and Across the Frontier of Science and Engineering

NSF does not provide a clear statement of expected performance for subsequent comparison with actual performance. The criteria for success in achieving the revised outcome resemble the previous criteria in being very general (e.g., "a robust and growing fundamental knowledge base"). The plan refers briefly to the scope of the COV in preparing reports but gives no helpful information about the guidelines or templates to be used by these committees. In addition, the plan identifies none of the improvements

Enclosure I

in the guidelines that NSF officials acknowledge are needed to avoid the problem of uneven quality evident in the first-year performance reports.

The plan does not clearly discuss the strategies and resources for achieving the performance goals. It lists in "bullet" format

- Four brief points about resources,
- Four slightly more detailed areas of emphasis, and
- Four areas of multidisciplinary research with two- or three-sentence summaries for areas as complex as global change.

Also, it provides no specific links between the resources and the areas of emphasis or the multidisciplinary research.

The plan does not provide confidence that performance information will be credible because, in particular, it offers little assurance that the inconsistent quality of committee reports will be effectively remedied. The plan gives a clear and important summary of the shortcomings in the first year of the committee reports on this outcome. These shortcomings included, among others, incomplete data making a performance rating impossible, ratings without complete information, the varying quality of the examples selected, and inconsistencies between the ratings and NSF's qualitative scale. The key problem with NSF's summary is that it remains entirely retrospective and makes no attempt to describe what will be done to address these shortcomings. This would have been an appropriate place to describe any revisions to the guidelines and templates and other efforts being undertaken to ensure uniformly high quality in the second year of committee reports.

Key Agency Outcome: Administer Research Grants Efficiently and Effectively

Fiscal Year 1999 Performance Goals and Measures for the Key Agency Outcome of Administering Research Grants Efficiently and Effectively

Among NSF's investment and management process goals, the following eight are directly related to this outcome:

Use of Merit Review

- Fiscal year 1999 goal: At least 90 percent of NSF's funds will be allocated to projects reviewed by appropriate peers external to NSF and selected through a merit-based competitive process.
- Actual: Ninety-five percent of projects allocated funds in fiscal year 1999 were merit reviewed. **(goal met)**

Implementation of Merit Review Criteria

- Fiscal year 1999 goal: NSF's performance in the implementation of the new merit review criteria is successful when reviewers address the elements of both generic review criteria (scientific quality and impact) appropriate to the proposal at hand and when program officers take the information provided into account in their decisions on awards; minimally effective when reviewers consistently use only a few of the suggested elements of the generic review criteria although others might be applicable.
- Actual: In fiscal year 1999, a total of 44 reports by external experts rated NSF on their use of the new merit review criteria. NSF was rated successful in achieving this goal by 36 of those reports. **(goal largely successful, needs improvement)**

Customer Service--Time to Prepare Proposals

- Fiscal year 1999 goal: Ninety-five percent of program announcements and solicitations will be available at least 3 months prior to proposal deadlines or target dates improving upon the fiscal year 1998 baseline of 66 percent.
- Actual: Seventy-five percent of program announcements and solicitations were available at least 3 months prior to proposal deadlines or target dates. **(goal not met)**

Customer Service--Time to Decision

- Fiscal year 1999 goal: Process 70 percent of proposals within 6 months of receipt improving upon the fiscal year 1998 baseline of 59 percent.
- Actual: Fifty-eight percent of proposals were processed within 6 months of receipt. **(goal not met)**

Electronic Proposal Processing

- Fiscal year 1999 goal: NSF will receive and process at least 25 percent of full proposal submissions electronically through FastLane, improving upon the fiscal year 1998 baseline of 17 percent.
- Actual: In fiscal year 1999, 44 percent of full proposal submissions were received through FastLane. **(goal met)**

Capability in Use of Information Technology

- Fiscal year 1999 goal: By fiscal year 1999, all staff will receive an orientation to FastLane, and at least 95 percent of program and program support staff will receive practice in using its key modules.
- Actual: Eighty percent of all employees received an orientation to FastLane and 40 percent of program and program support staff received practice in using its key modules. **(goal not met)**

Year 2000

- Fiscal year 1999 goal: NSF will complete all activities needed to address the Year 2000 problem for its information systems according to plan, on schedule, and within budget during fiscal year 1999.
- Actual: NSF said that it achieved this goal. **(goal met)**

Project Reporting System

- Fiscal year 1999 goal: During fiscal year 1999, at least 70 percent of all project reports will be submitted through the electronic Project Reporting System.
- Actual: Fifty-nine percent of all projects reports were submitted through the electronic Project Reporting System. **(goal not met)**

GAO's Observations on NSF's Fiscal Year 1999 Actual Performance for the Key Agency Outcome of Administering Research Grants Efficiently and Effectively

NSF has not created a specific mission outcome with respect to administering research grants efficiently and effectively. This mission outcome may be inferred from eight of the performance goals included in NSF's investment and management process goals. These eight goals contribute to measuring such an outcome but may not be the only issues needed to be considered in a comprehensive assessment of grant administration.

NSF discusses clear progress toward achieving the performance goals. The measures set high standards and percentages for achieving most goals (such as the use of merit review) and appropriately lower percentages for others (such as the use of FastLane [a new electronic proposal and award information system] in the goal for Electronic Proposal Processing). The goals and their measures are objective and quantifiable with the exception of the goal for Implementation of Merit Review Criteria, which used the OMB-approved alternative format.

The performance report clearly articulates the degree to which NSF achieved its goals, with precise percentages showing how far NSF exceeded or fell short of its targets. For example, NSF exceeded the goal for Use of Merit Review by 5 percent and fell short of its goal for Customer Service--Time to Prepare Proposals by 20 percent. In the case of the goal for Implementation of Merit Review Criteria, the one nonquantitative goal among these eight goals, the report clearly discusses the COV and AC reports from which NSF drew its conclusion that the agency was largely successful.

Despite this apparent precision, NSF provides virtually no assurance that the performance information is credible with respect to these goals. The report frequently states the absence of data-related problems but does not describe the steps taken to verify and validate the data. For the goals including Use of Merit Review, Customer Service--Time to Prepare Proposals, Customer Service--Time to Decision, Electronic Proposal Processing, Capability in Use of Information Technology, and Year 2000, the report indicates that data limitations were generally nonexistent or, in one case, early issues were corrected. For the goal Project Reporting System, the report states that paper copies of reports not captured electronically are not counted but does not indicate the extent to which this might influence the data. For the goal Implementation of Merit Review Criteria, the report noted that adequate data were not always available.

The limitations of the report in terms of verification and validation are especially evident in the presentation of NSF's Data Quality Project. In a one-page overview of data verification and validation activities, the report lists six objectives associated with the Data Quality Project for the Investment and Management goals, including these eight goals. The first objective, for example, is to evaluate the quality of the data in the central databases at NSF. The report provides no additional information about the Data Quality Project, its six objectives, or the status of its activities.

Unmet Fiscal Year 1999 Performance Goals and Measures for the Key Agency Outcome of Administering Research Grants Efficiently and Effectively

Enclosure I

According to the performance report, the goals for Customer Service--Time to Prepare Proposals, Customer Service--Time to Decision, Capability in Use of Information Technology, and Project Reporting System were not achieved, and the results for the goal Implementation of Merit Review Criteria, while largely successful, needed some improvement.

GAO's Observations on NSF's Unmet Fiscal Year 1999 Performance Goals and Measures for the Key Agency Outcome of Administering Research Grants Efficiently and Effectively

NSF does not provide both a statement of the reasons for falling short of these goals and a strategy to attain them. In general, the report does not explain why NSF failed to attain the goals but does provide a strategy for attaining them in the future. For the goal Project Reporting System, however, the report explains the reasons for not attaining it but provides no plan for doing so in the future.

More specifically, for the goal Implementation of Merit Review Criteria, which was largely successful, the report does not explain the reasons for shortcomings in some cases but notes that NSF has re-issued guidance to applicants and reviewers, stressing the importance of using both criteria (scientific quality and impact) in preparing and evaluating proposals submitted to NSF.

For the goal Customer Service--Time to Prepare Proposals, NSF plans to determine why the goal was not met. The report also notes that a Web-based system for creating program announcements has been established and is expected to aid in achieving this goal.

For the goal Customer Service--Time to Decision, NSF does not explain why the goal was not met. NSF plans to shorten the award-processing time by making more effective use of electronic mechanisms and carefully tracking the processing of all proposals. Additional discussion of the problems and strategies for achieving this goal would have been helpful because NSF's performance actually slipped from 59 percent in fiscal year 1998 to 58 percent in fiscal year 1999.

For the goal Capability in Use of Information Technology, NSF does not explain why the goal was not met but notes that staff will be strongly encouraged to attend orientation and training sessions. While the performance report makes no additional observations, NSF's fiscal year 1999 accountability report notes that the most common reason for not attending orientation and training sessions was scheduling conflicts. In fiscal year 2000, the number of class offerings will be increased to ensure that the goal is met.

For the goal Project Reporting System, NSF provides a clear explanation of the reasons why it missed the goal, including transition to a new reporting system and granting permission to scientists submitting proposals to use the old paper report forms during the first 3 months of the fiscal year. NSF states that the new system is being modified

Enclosure I

and enhanced but does not provide details about these improvements or any other steps to meet the goal.

Fiscal Year 2000 Performance Goals and Measures for the Key Agency Outcome of Administering Research Grants Efficiently and Effectively

Electronic Proposal Processing

- Fiscal year 2000 goal: NSF's plan raises its performance measure from 25 percent to 60 percent for submitting proposals electronically. **(goal revised)**

Capability in Use of Information Technology

- Fiscal year 2000 goal: NSF's plan maintains its performance measure at 100 percent for orientation to FastLane but reduces its performance measure from 95 to 80 percent for program and program support staff to receive training. **(goal revised)**

Project Reporting System

- Fiscal year 2000 goal: This goal has a new performance measure for eligible project reports to be submitted through the electronic Project Reporting System. NSF has raised the goal to 85 percent. **(goal revised)**

GAO's Observations on NSF's Fiscal Year 2000 Planned Performance for the Key Agency Outcome of Administering Research Grants Efficiently and Effectively

For the goal Electronic Proposal Processing, NSF's fiscal year 1999 goal was 25 percent, and fiscal year 1999 results showed that 44 percent of the proposals were submitted electronically. NSF does not provide a clear explanation for setting the increased goal at 60 percent in fiscal year 2000. NSF said that the goal will be met through increasing the user friendliness of the system, programs requiring submission through FastLane, stronger efforts to encourage such submission, enhanced staff training, and additional resources requested.

For the goal Capability in Use of Information Technology, NSF's plan does not explain the reduction from 95 to 80 percent as a goal for training staff in FastLane. NSF's discussion of this goal is very brief and provides little specific information on how it will be achieved.

For the goal Project Reporting System, NSF's fiscal year 1999 goal was 70 percent, and fiscal year 1999 results showed that 59 percent of project reports were submitted

Enclosure I

through the new Project Reporting System. NSF does not provide a clear explanation for setting the increased goal at 85 percent in fiscal year 2000. NSF said that the goal will be met through revisions to a relevant manual and issuance of a notice to grantees requiring that all project reports be submitted electronically in fiscal year 2000.

Fiscal Year 2001 Performance Goals and Measures for the Key Agency Outcome of Administering Research Grants Efficiently and Effectively

Implementation of Merit Review Criteria

- Fiscal year 2001 goal: This goal includes a new criterion—integration of research and education in reviews. In addition, in a pilot effort, at least 50 percent of research grant proposals will address this new element along with previous elements. **(goal revised)**

Customer Service--Time to Decision

- Fiscal year 2001 goal: This goal increases its performance measure from 70 percent to 75 or 80 percent (see discussion of this discrepancy) for processing of proposals within 6 months of receipt. **(goal revised)**

Electronic Proposal Processing

- Fiscal year 2001 goal: This goal has a new performance measure, increasing to 95 percent for submission of proposals electronically. **(goal revised)**

Year 2000

- Fiscal year 2001 goal: This goal, involving Year 2000 issues, has been achieved and omitted from the fiscal year 2001 plan. **(goal discontinued)**

Project Reporting System

- Fiscal year 2001 goal: This goal has a new performance measure, increasing to 95 percent for eligible project reports to be submitted through the electronic Project Reporting System. **(goal revised)**

In addition to these modifications to existing goals, NSF has added two new goals that relate to administering research grants efficiently and effectively.

Electronic Proposal Processing

- Fiscal year 2001 goal: NSF will conduct 10 pilot paperless projects that manage the competitive review process in a totally electronic environment. **(new goal)**

Work Environment

- Fiscal year 2001 goal: NSF will strive to provide NSF staff with a physical environment that is safe and well-equipped with current technology tools. The remainder of this goal, as stated in the plan, does not appear directly relevant to administering grants efficiently and effectively. **(new goal)**

GAO's Observations on NSF's Fiscal Year 2001 Planned Performance for the Key Agency Outcome of Administering Research Grants Efficiently and Effectively

For the goal Implementation of Merit Review Criteria, the report clearly states NSF's intention of making the integration of research and education a key part of the proposals and the agency's review of these proposals. The report also includes a clear statement of its actions to achieve this goal, including modifying its program announcements and reissuing guidance to applicants and reviewers that stresses the importance of this new criterion. NSF will use the directorate advisory committees to monitor this goal and will ask them to describe in their reports the samples and evidence supporting their conclusions about its attainment. This is one of the few specific statements in conjunction with a goal about activities to enhance the credibility of the information.

For the goal Customer Service--Time to Decision, NSF's fiscal year 2001 plan states the performance goal as 75 and 80 percent on the same page. The correct goal cannot be determined from the context. NSF's statement of its strategy repeats the agency's fiscal year 2000 plan. Additional discussion of the problems and strategies for achieving this goal would have been helpful because NSF's performance actually slipped from 59 percent in fiscal year 1998 to 58 percent in fiscal year 1999. The plan states that no data limitations exist in verifying this information, but the absence of a clear discussion of the Data Quality Project diminishes confidence in the credibility of the data.

For the goal Electronic Proposal Processing, our comments on this goal in the fiscal year 2000 plan hold true for the new goal of 95 percent. The only addition to the fiscal year 2001 plan is a reference to establishing a Helpdesk to assist external customers.

For the goal Project Reporting System, NSF clearly states its intention of reaching 95 percent for project reports to be submitted through the Project Reporting System. The report stresses the importance of moving quickly to reach this goal so the database represents the outputs and outcomes of NSF-funded activities. The report repeats the strategy stated in the fiscal year 2000 plan for achieving this goal. To enhance the credibility of the information, the Division of Information Systems and the Budget Division will jointly monitor the Project Reporting System and data on its use. This is

Enclosure I

another helpful statement indicating a specific effort that should strengthen the credibility of the information.

For the new goal Electronic Proposal Processing, NSF states its goal clearly and adds that, during fiscal year 2000, NSF was to address the barriers to achieving this goal but does not describe the efforts to address these barriers. NSF notes that many reviewers are not comfortable with electronic proposals, and it may be important to generate hard copies for reviewers who want them. This caveat appears to undermine NSF's determination to achieve the goal.

For the new goal Work Environment, NSF's new goal appears to address the technology involved in FastLane under the previous goal for Capability in Use of Information Technology. However, NSF makes no specific reference to FastLane in its fiscal year 2001 plan, although training in this technology was one of the goals of NSF's fiscal year 2000 plan. The new goal, as stated, is very general and contains no performance measures. In addition, the plan contains no reference to any progress toward achieving the FastLane goal of training 80 percent of staff to use this technology.

Enclosure II

Observations on the National Science Foundation's Efforts to Address Its Major Management Challenges

The following table identifies the major management challenges confronting the National Science Foundation. The first column lists the major management challenges identified by NSF's Inspector General (IG). The second column discusses what progress, as discussed in its fiscal year 1999 performance report, NSF made in addressing its major management challenges. The third column discusses the extent to which NSF's fiscal year 2001 performance plan includes performance goals and measures to address the management challenges that the IG identified.

Major management challenge	Progress in addressing major management challenge as discussed in the fiscal year 1999 performance report	Applicable goals and measures in the fiscal year 2001 performance plan
Managing an effective merit review system	<p>In the fiscal year 1999 performance report, two performance goals relate to merit review, which at NSF involves assessing scientific quality and impact: (1) At least 90 percent of NSF's funds will be allocated to projects that undergo merit review and (2) use of merit review criteria by reviewers and staff. The performance report indicates clear progress toward achieving these goals and thus responds to the management challenge. NSF fully achieved the first goal and was largely successful in implementing the second goal. In the case of the second goal, which adhered to the OMB-prescribed format for nonquantitative goals, the performance report clearly discusses the reports by the Committees of Visitors and Advisory Committees from which NSF drew its conclusion that the agency was largely successful.</p> <p>Despite this apparent precision, the performance report provides virtually no assurance that the performance information is credible with respect to these goals. For the first goal, the report indicates that data limitations were nonexistent but does not describe the steps taken to verify and validate the data. For the second goal, the report noted that adequate data was not always available. Also, for the second goal, the report does not explain the reasons for shortcomings in some cases but notes that NSF has reissued guidance to applicants and reviewers, stressing the importance of using both scientific quality and impact criteria in preparing and</p>	<p>In the fiscal year 2001 performance plan, the same two performance goals relate to merit review. However, the second goal includes a new criterion as part of "impact" for fiscal year 2001, namely, the integration of research and education. In a pilot effort, at least 50 percent of research grant proposals will address this new element along with previous elements. The fiscal year 2001 performance plan presents a specific, measurable mark for the first goal and for the new element in the second goal. The plan also includes a clear statement of its actions to achieve this goal, including modifying its program announcements and reissuing guidance to applicants and reviewers, stressing the importance of this new criterion. NSF will use the directorate advisory committees to monitor this goal and will ask them to describe the samples and evidence supporting their conclusions about its attainment in their reports.</p> <p>NSF's IG views merit review as a continued "challenge" but not as a major problem. The IG indicated that the agency has taken steps to maintain high standards and has achieved the GPRA-related goals for merit review. Therefore, the current conditions are adequately managed, but the IG believes that NSF must be alert to emerging situations that could result in this becoming a problem. The IG also noted that NSF reports annually to the National Science Board on its use of merit review. The IG said that the most recent</p>

Enclosure II

Major management challenge	Progress in addressing major management challenge as discussed in the fiscal year 1999 performance report	Applicable goals and measures in the fiscal year 2001 performance plan
Capitalizing on NSF's strengths when responding to increased expectations	The fiscal year 1999 performance report does not discuss this as a major management challenge.	<p>report (dated Mar. 31, 2000) identified no problems in this area at NSF.</p> <p>The fiscal year 2001 performance plan does not discuss this as a major management challenge. Although no longer seeing this as a major management challenge, the IG stressed the need for NSF to stay alert to emerging issues and ensure that they do not become major challenges in the future. The IG expects NSF will continue to review opportunities and look for ways to incorporate its strengths in its annual performance plan or budget request as appropriate.</p>
Using the Government Performance and Results Act	The fiscal year 1999 performance report does not discuss this as a major management challenge.	<p>The fiscal year 2001 performance plan does not discuss this as a major management challenge. Although no longer seeing this as a major management challenge, the IG stressed the need for NSF to stay alert to emerging issues and ensure that they do not become major challenges in the future. The IG noted that a goal and the measures for this challenge are not needed in the performance plan because NSF has a GPRA process in place with weekly meetings and a high level of agency involvement.</p>
Responding to the Chief Financial Officer's Act	The fiscal year 1999 performance report does not discuss this as a major management challenge.	<p>The fiscal year 2001 performance plan does not discuss this as a major management challenge. Although no longer seeing this as a major management challenge, the IG stressed the need for NSF to stay alert to emerging issues and ensure that they do not become major challenges in the future. The IG noted that NSF received an unqualified opinion on its fiscal year 1999 financial statements. This challenge, according to the IG, receives thorough attention in NSF and does not need to be addressed with a goal and measures in the performance plan.</p>
Implementing FastLane: a new electronic proposal and award data information system	In the fiscal year 1999 performance report, two performance goals related to this challenge. NSF achieved the goal of receiving and processing at least 25 percent of full proposal submissions electronically through FastLane, improving upon the fiscal year 1998 baseline of 17 percent. Results	<p>In the fiscal year 2001 performance plan, the measure for the first goal is increased to 95 percent for submission of full proposals electronically. The only other addition to this goal is a reference to establishing a Helpdesk to assist external customers.</p>

Enclosure II

Major management challenge	Progress in addressing major management challenge as discussed in the fiscal year 1999 performance report	Applicable goals and measures in the fiscal year 2001 performance plan
	<p>showed that 44 percent of proposals were submitted electronically.</p> <p>NSF did not achieve the second goal-- by fiscal year 1999, all staff would receive an orientation to FastLane and at least 95 percent of program and program support staff would receive practice in using its key modules. NSF does not explain why this goal was not met but notes that staff will be strongly encouraged to attend orientation and training sessions. While the performance report makes no additional observations, NSF's fiscal year 1999 accountability report notes that the most common reason for not attending orientation and training sessions was scheduling conflicts. In fiscal year 2000, the number of class offerings will be increased to help ensure that the goal is met.</p>	<p>The fiscal year 2001 plan makes no reference to the second goal involving staff orientation to FastLane, nor does it explain its absence. However, the plan states that NSF will conduct 10 pilot paperless projects that manage the competitive review process in a totally paperless environment. The plan further requires project reporting through FastLane and sets a goal of 95 percent.</p> <p>The IG no longer sees this as a major management challenge but stressed the need for NSF to stay alert to emerging issues and ensure that they do not become major challenges in the future. The IG cited the generally rapid progress toward implementing FastLane procedures but stated that certain legal issues, such as signatures in a paperless environment still need to be addressed.</p>
Managing the Antarctic program	<p>The fiscal year 1999 performance report does not discuss this as a major management challenge.</p>	<p>The fiscal year 2001 performance plan does not discuss this as a major management challenge. The IG noted that NSF is monitoring the program closely and that construction is ahead of schedule. However, the IG also discussed the following aspects of the program that may increase its vulnerability to problems: (1) the large amount of money committed to the program, (2) the complexity of managing a program at a great distance, and (3) the transition to a new contractor. However, the IG does not see a need to include specific goals and measures for this program in future GPRA plans.</p>
Sustaining high scholarship and integrity	<p>The fiscal year 1999 performance report does not discuss this as a major management challenge.</p>	<p>With reference to sustaining high scholarship and integrity, the fiscal year 2001 performance plan does not discuss this as a major management challenge. The IG said that this challenge was poorly phrased and that the principal issues are the prevention and the detection of fraud. The IG views this as a relatively limited problem involving only a few cases. The IG said that NSF identifies a small number of cases for follow-up each year but that only one or two may be prosecutable.</p>
Spending funds effectively and efficiently	<p>The fiscal year 1999 performance report does not</p>	<p>This and the two remaining management challenges</p>

Enclosure II

Major management challenge	Progress in addressing major management challenge as discussed in the fiscal year 1999 performance report	Applicable goals and measures in the fiscal year 2001 performance plan
	discuss this as a major management challenge.	<p>are all part of a single larger issue about the adequacy of NSF's strategy and resources for effective oversight. After discussions of each challenge separately, general observations follow.</p> <p>The fiscal year 2001 performance plan does not discuss this as a major management challenge. The IG said that this challenge was poorly phrased and that the principal issue is to ensure that the awards are adequately monitored for compliance with regulations. According to the IG, it remains a major management challenge. The IG said that NSF may need additional resources to expand this oversight activity to a significant degree. In the vast majority of cases, NSF relies on interim reports from grantees to monitor progress but is unable to ensure the reliability of these reports. NSF can make site visits or other monitoring efforts for only a limited number of awards.</p> <p>Another problem, according to the IG, is the lack of integrated oversight between program managers and the accountants. The IG said that more coordination of oversight and better procedures for the program officers are needed.</p> <p>The IG also said that NSF needs to design and implement an oversight, compliance program to monitor its awards consistent with the awards' vulnerability to risk.</p>
Managing an effective system for cost-sharing	The fiscal year 1999 performance report does not discuss this as a major management challenge.	<p>The fiscal year 2001 performance plan does not discuss this as a major management challenge. However, the IG said that the same comments on spending funds effectively and efficiently apply to this management challenge and described it as merely a more specific area of concern about oversight. The IG said that this area needs improvement. Audits at the end of a project may disclose a problem, but when the problem is identified at that point, it is too late to make adjustments.</p>

Enclosure II

Major management challenge	Progress in addressing major management challenge as discussed in the fiscal year 1999 performance report	Applicable goals and measures in the fiscal year 2001 performance plan
		<p>The IG also noted that institutions are required to certify that they have met their cost-sharing requirements, but NSF is not always receiving these certifications. Even if the certifications are received, NSF does not know whether the universities have stated and monitored the cost-sharing activities in a reliable manner. In addition, NSF is generally not in a position to validate the certifications. The problem, according to the IG, is not sure of the best practices for ensuring compliance.</p>
Managing salaries and administrative resources	<p>The fiscal year 1999 performance report does not discuss this as a major management challenge.</p>	<p>The fiscal year 2001 performance plan does not discuss this as a major management challenge. However, the IG said that this challenge is another aspect of NSF's need for better oversight. The IG said that NSF has focused on the "front end" activities involved in making awards but has given less attention to the need for oversight work.</p> <p>The problem of oversight is compounded by the fact that NSF's funds are being committed to larger projects, often with multidisciplinary elements and several funding recipients. These factors complicate the task of monitoring awards effectively. In addition, according to the IG, NSF's efforts to broaden participation in its activities mean funds are going not only to traditional recipients, such as large institutions, that have the resources and the experience to ensure their own compliance but to institutions that have neither the resources nor the experience to ensure compliance.</p> <p>Observations: These final three management challenges reflect the IG's underlying concern about effective oversight at NSF. As such, these challenges might be suitable for inclusion in a future GPRA performance plan. They could be formatted as a GPRA goal in which NSF plans to assess the relative vulnerabilities of its programs and set an appropriate number of site visits, telephone calls, and other monitoring efforts for each program.</p>

Enclosure II

Major management challenge	Progress in addressing major management challenge as discussed in the fiscal year 1999 performance report	Applicable goals and measures in the fiscal year 2001 performance plan
		<p>Such a prioritization by level of risk would enable NSF to relate the level of risk to the level of oversight needed.</p> <p>NSF's lack of a clear statement about these three challenges involving effective oversight in the fiscal year 2001 performance plan reflects a problem that, if left unresolved, could lead to inadequate oversight of its programs. NSF needs to ensure a greater responsiveness to the IG's perception of management challenges by considering and, where appropriate, addressing these challenges in future GPRA plans.</p> <p>NSF might consider whether to (1) develop a clear statement of the IG's concerns about oversight activities, (2) assess the agency's programs for their degree of risk, (3) set measurable goals with the level of monitoring corresponding to the level of risk, (4) identify the level of resources needed to achieve these goals, and (5) make these goals and measures a clear part of the GPRA performance plans in the future.</p>

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